

## Complete Summary

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### **GUIDELINE TITLE**

Guidelines for the performance of fusion procedures for degenerative disease of the lumbar spine. Part 5: correlation between radiographic and functional outcome.

### **BIBLIOGRAPHIC SOURCE(S)**

Resnick DK, Choudhri TF, Dailey AT, Groff MW, Khoo L, Matz PG, Mummaneni P, Watters WC 3rd, Wang J, Walters BC, Hadley MN, American Association of Neurological Surgeons/Congress of Neurological Surgeons. Guidelines for the performance of fusion procedures for degenerative disease of the lumbar spine. Part 5: correlation between radiographic and functional outcome. J Neurosurg Spine 2005 Jun;2(6):658-61. [10 references] [PubMed](#)

### **GUIDELINE STATUS**

This is the current release of the guideline.

## COMPLETE SUMMARY CONTENT

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## SCOPE

### **DISEASE/CONDITION(S)**

Degenerative disease of the lumbar spine

### **GUIDELINE CATEGORY**

Evaluation

### **CLINICAL SPECIALTY**

Internal Medicine  
Neurological Surgery  
Neurology  
Orthopedic Surgery  
Physical Medicine and Rehabilitation  
Radiology

## **INTENDED USERS**

Physicians

## **GUIDELINE OBJECTIVE(S)**

To examine the literature regarding the relationship between fusion status and clinical outcome after lumbar arthrodesis procedures performed in the treatment of lumbar spinal degenerative disease

## **TARGET POPULATION**

Patients with degenerative disease of the lumbar spine treated with lumbar fusion

## **INTERVENTIONS AND PRACTICES CONSIDERED**

1. Assessment of radiographic fusion
2. Assessment of functional outcome

## **MAJOR OUTCOMES CONSIDERED**

- Functional outcome
- Radiologic outcome (fusion status)
- Correlation between fusion status and clinical outcome

## **METHODOLOGY**

### **METHODS USED TO COLLECT/SELECT EVIDENCE**

Hand-searches of Published Literature (Primary Sources)  
Hand-searches of Published Literature (Secondary Sources)  
Searches of Electronic Databases

### **DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE**

A computerized search of the database of the National Library of Medicine of articles published between 1966 and July 2003 was conducted using the search terms "lumbar spine fusion assessment" or "lumbar spine pseudarthrosis" or "lumbar spine fusion outcome." The search was restricted to references in the English language involving humans. This yielded a total of 1076 references. The titles and abstracts of each of these references were reviewed. Papers not concerned with the assessment of postoperative fusion status or those not focused on adult degenerative lumbar disease (for example, trauma-related

fractures, infection, scoliosis, and isthmic spondylolisthesis) were discarded. Additional articles were obtained from the bibliographies of the selected articles. Thirty-seven references were identified that provided either direct or supporting evidence relevant to the clinical utility of the radiographic assessment of lumbar fusion status. These papers and references were obtained and reviewed. Papers providing Class III or better medical evidence regarding the relationship between fusion status and clinical outcome following lumbar arthrodesis procedures for degenerative disease are listed in Table 1 in the original guideline document. Supportive data are provided by additional references as listed in the *Reference* section of the original guideline.

## **NUMBER OF SOURCE DOCUMENTS**

8 reports involving Class III or better medical evidence are listed in Table 1 in the original guideline document.

## **METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE**

Weighting According to a Rating Scheme (Scheme Given)

## **RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE**

### **Classes of Evidence**

**Class I** Evidence from one or more well-designed, randomized controlled clinical trials, including overviews of such trials

**Class II** Evidence from one or more well-designed comparative clinical studies, such as nonrandomized cohort studies, case-control studies, and other comparable studies, including less well-designed randomized controlled trials

**Class III** Evidence from case series, comparative studies with historical controls, case reports, and expert opinion as well as significantly flawed randomized controlled trials

## **METHODS USED TO ANALYZE THE EVIDENCE**

Systematic Review with Evidence Tables

## **DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE**

The group culled through literally thousands of references to identify the most scientifically robust citations available concerning each individual topic. Not every reference identified is cited. In general, if high-quality (Class I or II) medical evidence was available on a particular topic, poorer-quality evidence was only briefly summarized and rarely included in the evidentiary tables. If no high-quality evidence existed, or if there was significant disagreement between similarly classified evidence sources, then the Class III and supporting medical evidence were discussed in greater detail. If multiple reports were available that provided similar information, a few were chosen as illustrative examples.

## **METHODS USED TO FORMULATE THE RECOMMENDATIONS**

Expert Consensus

## **DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS**

In January 2003, a group was formed at the request of the leadership of the Congress of Neurological Surgeons (CNS) by the executive committee of the American Association of Neurological Surgeons/CNS Joint Section on Disorders of the Spine and Peripheral Nerves to perform an evidence-based review of the literature on lumbar fusion procedures for degenerative disease of the lumbar spine and to formulate treatment recommendations based on this review. In March 2003, this group was convened. Invitations were extended to approximately 12 orthopedic and neurosurgical spine surgeons active in the Joint Section or in the North American Spine Society to ensure participation of nonneurosurgical spine surgeons. The recommendations that were developed represent the product of the work of the group, with input from the Guidelines Committee of the American Association of Neurological Surgeons/CNS and the Clinical Guidelines Committee of North American Spine Society.

## **RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS**

### **Grades of Recommendation**

**Standards** Recommendations of the strongest type, based on Class I evidence reflecting a high degree of clinical certainty

**Guidelines** Recommendations based on Class II evidence reflecting a moderate degree of clinical certainty

**Options** Recommendations based on Class III evidence reflecting unclear clinical certainty

## **COST ANALYSIS**

Lumbar fusion may be associated with a high short-term cost, especially if instrumentation is placed; however, there appear to be long-term economic benefits associated with lumbar fusion including resumption of employment. To describe the economic impact of lumbar fusion for degenerative disease adequately, it is important to define the patient population treated with fusion and to compare efficacy as well as the costs of other treatment alternatives. Any such analysis should include both short- and long-term costs and benefits.

See "Part 3: assessment of economic outcome" in the "Availability of Companions Documents" field for the complete analysis.

## **METHOD OF GUIDELINE VALIDATION**

External Peer Review

Internal Peer Review

## DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The committee presents data that have been reviewed by the major organizations representing neurological surgery and orthopedic surgery. The Board of Directors of the American Association of Neurological Surgeons (AANS) and the Congress of Neurological Surgeons (CNS) Executive Committee have reviewed these Lumbar Fusion Guidelines and formally voted their approval. In addition, input and approval was received and greatly appreciated from the AANS/CNS Guidelines committee.

## RECOMMENDATIONS

### MAJOR RECOMMENDATIONS

The grades of recommendations (standards, guidelines, and options) and classes of evidence (I–III) are defined at the end of the "Major Recommendations" field.

**Standards.** There is insufficient evidence to recommend a treatment standard.

**Guidelines.** There is insufficient evidence to recommend a treatment guideline.

**Options.** It is recommended that when performing lumbar arthrodesis for degenerative lumbar disease, strategies to achieve successful radiographic fusion should be considered. There appears to be a correlation between successful fusion and improved clinical outcomes; however, it should be noted that the correlation between fusion status and clinical outcome is not strong, and in a given patient, fusion status may be unrelated to clinical outcome.

### Summary

At the present time, there is no Class I or II medical evidence to indicate that the appearance of a radiographic fusion is significantly associated with improved functional outcomes. The majority of Class III medical evidence does suggest that successful radiographic fusion is associated with improved clinical outcomes. It is widely acknowledged that this relationship is not perfect.

### Definitions:

#### Grades of Recommendation

**Standards** Recommendations of the strongest type, based on Class I evidence reflecting a high degree of clinical certainty

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**Options** Recommendations based on Class III evidence reflecting unclear clinical certainty

#### Classes of Evidence

**Class I** Evidence from one or more well-designed, randomized controlled clinical trials, including overviews of such trials

**Class II** Evidence from one or more well-designed comparative clinical studies, such as nonrandomized cohort studies, case-control studies, and other comparable studies, including less well-designed randomized controlled trials

**Class III** Evidence from case series, comparative studies with historical controls, case reports, and expert opinion as well as significantly flawed randomized controlled trials

## **CLINICAL ALGORITHM(S)**

None provided

## **EVIDENCE SUPPORTING THE RECOMMENDATIONS**

### **TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS**

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations").

## **BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS**

### **POTENTIAL BENEFITS**

Better understanding of the correlation between radiographic and functional outcome

### **POTENTIAL HARMS**

Not stated

## **QUALIFYING STATEMENTS**

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The strength of an evidence-based document is only as strong as the foundation on which it is built. This comprehensive document chronicles the state of scientific information in 2005. Many of the published reviews presented flawed results due to poorly defined outcome measures, inadequate numbers of patients, and comparison of dissimilar treatment groups. These studies of "apples and oranges" gleaned little scientific information; therefore, for the purpose of this review, the authors have discarded Class III studies whenever stronger scientific evidence was available. The result is that most of the published studies on lumbar fusion were not included on this document. When Class I or II scientific evidence was available, standards and guidelines were formulated; however, in most cases, the scientific data were only adequate to support recommendations for treatment options. The aforementioned results do not detract from the importance of this

document; rather, the need for the neurosurgical community to design and complete prospective randomized controlled studies to answer the many lingering clinical questions with rigorous scientific power can clearly be seen. As more data continue to be accumulated, revisions of this document will be needed.

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

## INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

### IOM CARE NEED

Getting Better  
Living with Illness

### IOM DOMAIN

Effectiveness

## IDENTIFYING INFORMATION AND AVAILABILITY

### BIBLIOGRAPHIC SOURCE(S)

Resnick DK, Choudhri TF, Dailey AT, Groff MW, Khoo L, Matz PG, Mummaneni P, Watters WC 3rd, Wang J, Walters BC, Hadley MN, American Association of Neurological Surgeons/Congress of Neurological Surgeons. Guidelines for the performance of fusion procedures for degenerative disease of the lumbar spine. Part 5: correlation between radiographic and functional outcome. J Neurosurg Spine 2005 Jun;2(6):658-61. [10 references] [PubMed](#)

### ADAPTATION

Not applicable: The guideline was not adapted from another source.

### DATE RELEASED

2005 Jun

### GUIDELINE DEVELOPER(S)

American Association of Neurological Surgeons - Medical Specialty Society  
Congress of Neurological Surgeons - Professional Association

### SOURCE(S) OF FUNDING

This project was funded entirely by a grant from AANS/CNS Section on Disorders of the Spine. No funding was received from any commercial entity to support the production or publication of these guidelines.

## **GUIDELINE COMMITTEE**

Guidelines Committee of the American Association of Neurological Surgeons/Congress of Neurological Surgeons (CNS)

## **COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE**

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## **FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST**

Not stated

## **ENDORSER(S)**

North American Spine Society - Medical Specialty Society

## **GUIDELINE STATUS**

This is the current release of the guideline.

## **GUIDELINE AVAILABILITY**

Electronic copies: Available in Portable Document Format (PDF) from the [AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves Web site](#).

Print copies: Available from Daniel K. Resnick, M.D., Department of Neurological Surgery, University of Wisconsin Medical School, K4/834 Clinical Science Center, 600 Highland Avenue, Madison, Wisconsin 53792; Email: [Resnick@neurosurg.wisc.edu](mailto:Resnick@neurosurg.wisc.edu).

## **AVAILABILITY OF COMPANION DOCUMENTS**

The following are available:

- Introduction to the guidelines for the performance of fusion procedures for degenerative disease of the lumbar spine. 2005 Jun. 1 p. Available in Portable Document Format (PDF) from the [AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves Web site](#).
- Guidelines for the performance of fusion procedures for degenerative disease of the lumbar spine. Part 1: introduction and methodology. 2005 Jun. 2 p.



- Available in Portable Document Format (PDF) from the [AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves Web site](#).
- Guidelines for the performance of fusion procedures for degenerative disease of the lumbar spine. Part 3: assessment of economic outcome. 2005 Jun. 6 p. Available in Portable Document Format (PDF) from the [AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves Web site](#).
  - Guidelines for the performance of fusion procedures for degenerative disease of the lumbar spine. Part 4: radiographic assessment of fusion. 2005 Jun. 5 p. Available in Portable Document Format (PDF) from the [AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves Web site](#).

Print copies: Available from Daniel K. Resnick, M.D., Department of Neurological Surgery, University of Wisconsin Medical School, K4/834 Clinical Science Center, 600 Highland Avenue, Madison, Wisconsin 53792; Email: [Resnick@neurosurg.wisc.edu](mailto:Resnick@neurosurg.wisc.edu).

## **PATIENT RESOURCES**

None available

## **NGC STATUS**

This NGC summary was completed by ECRI on January 5, 2007. The information was verified by the guideline developer on January 29, 2007.

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